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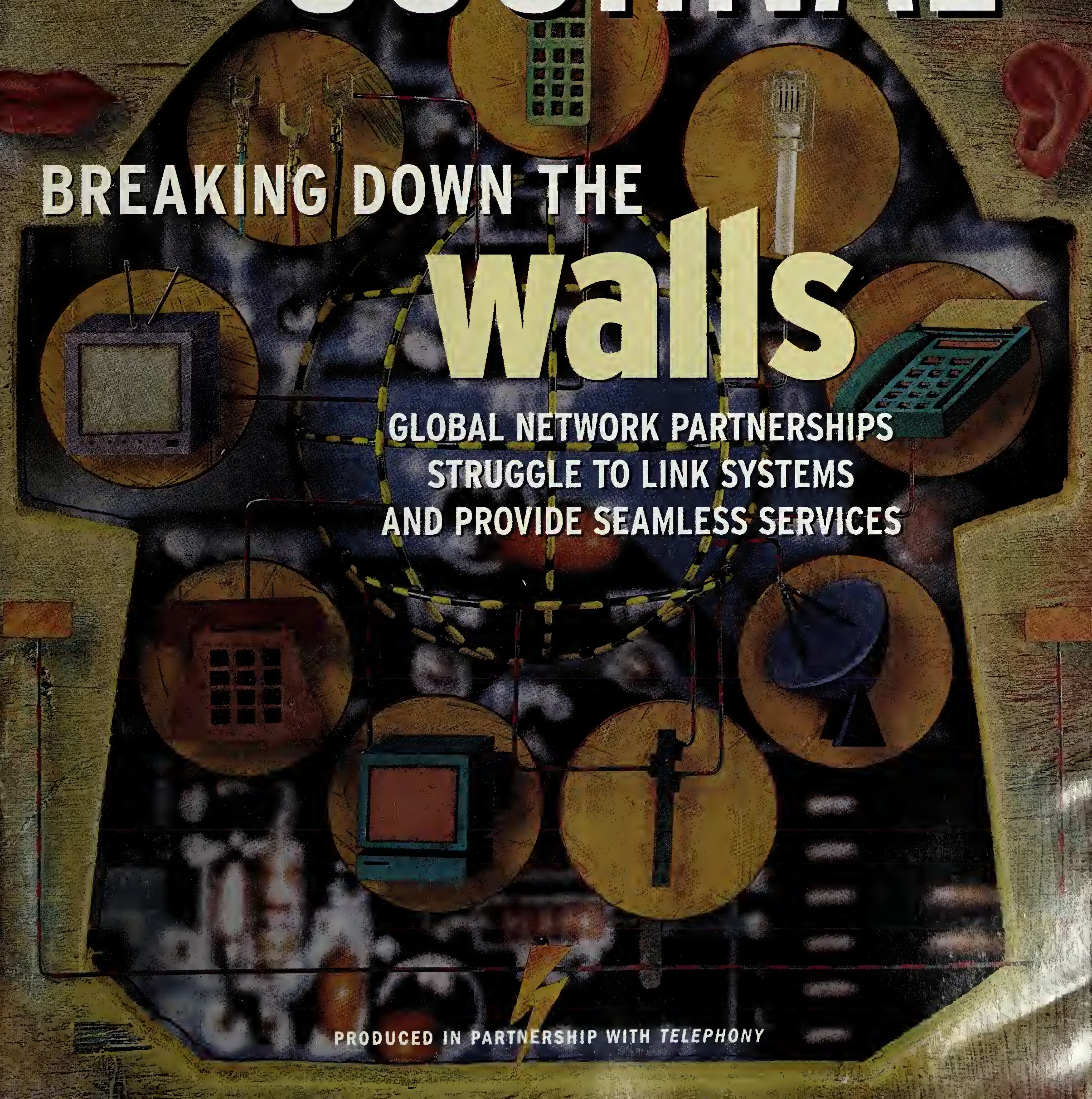

BREAKING DOWN THE walls

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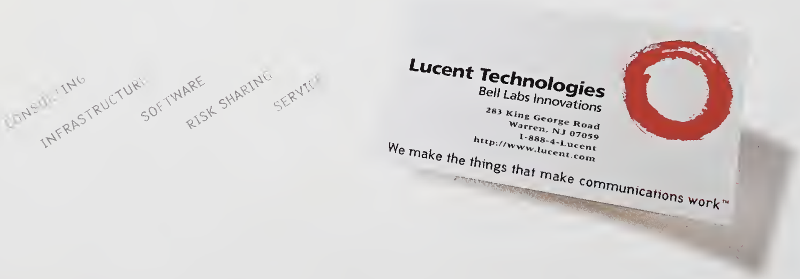

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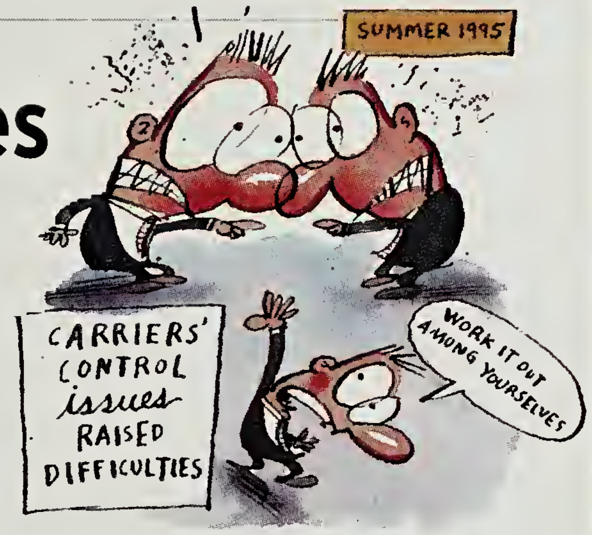
Breaking Down the Walls

T8 U.S. and overseas carriers have (more or less) successfully tied their networks together to provide seamless global networking services. Now corporate users want them to link back-end systems to provide one-stop billing, support, marketing and network management. Global partners are working on it but are hampered by the essential proprietary nature of their respective systems. And most haven't even done it across their own services. *By Paul Korzeniowski*

A Clash of Cultures

T16 The initial meeting of the I-Way project resembled an encounter between the Jets and the Sharks. Indeed, the year-long construction of a prototype ATM network involved several types of unprecedented collaboration among rival carriers and between carriers and users. As a result, each side gained valuable insight into what makes the other side tick, laying the groundwork for building an Internet-like national ATM network in the future. *By Denise Pappalardo*


SUMMER 1995
CARRIERS' CONTROL issues RAISED DIFFICULTIES
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departments

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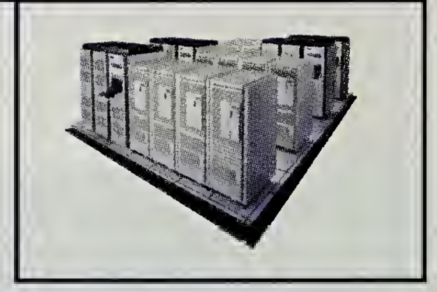

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the loop

A REVIEW OF TELECOM TECHNOLOGY AND BUSINESS HAPPENINGS

Telstra Tackles Info Integration

U.S. carriers that are looking to survive the new market free-for-all need look no further than down under for a preview

Last June, Australian carrier Telstra Corp. faced a major challenge when competitor Optus Communications introduced the country's first metropolitan telephony service offered on non-Telstra bandwidth. Orders started pouring in at the rate of 2,000 an hour, according to Audrey Mandella, senior vice president of Boston consultancy The Yankee Group's international division.

Optus, whose co-owners include Cable & Wireless, Inc. and BellSouth Corp., won the second Australian license back in 1992. Optus initially focused on the consumer rather than on the business market, winning an average of 12% to 15% of new carrier selections. "Not bad for a pretty new carrier," Mandella said. With its newly installed fiber-optic lines, however, Optus is moving to challenge Telstra in new markets, such as metropolitan-area basic telephony services and integrated cable television.

It sounds like the kind of nightmare that U.S. Bell operating companies (BOC) face, now that the Telecom Reform Bill has passed.

Unlike the BOCs, however, Telstra has not been "waiting until it hits the pain threshold" before responding to encroaching competitors, noted Beth Adams, managing director of the Network Management Forum (NMF) in Morristown, N.J.

On the contrary, Telstra began gearing up for a more competitive market years before Optus started muscling in on its turf, Mandella said.

In a recent speech to accountants, Telstra Chief Executive Officer Frank Blount listed his current top strategic priorities: to reposition the company "in a dynamic and fundamentally changing industry and environment" through partnerships and joint ventures; to "deliver better services at a lower price" in a commercially viable fashion; and to "move into new areas beyond traditional telecommunications to compensate for the loss of market share, which is the inevitable fate of an ex-monopoly in a highly competitive market."

New service areas Telstra is now actively targeting include cable TV and interactive, multimedia home shopping.

In all of the above strategies, information technology plays a crucial role.

Telstra is in the midst of "a huge effort to develop an integrated, cradle to grave" flow of information "from network operations through billing services," said Frank Dzubeck, president of Communications Network Architects, Inc., a consultancy in Washington.

Virtually all major carriers need to eventually provide this type of integration to cut costs and offer customers efficient, "one touch" service, Adams said. "The implication of one touch for customers is that instead of being bounced around till a problem gets addressed, the first representative you deal with has the tools and information to handle your requests online."

Telstra's five-year plan is to replace its current mix of proprietary, homegrown network plant management systems with a single, integrated platform, said Alan Young, the carrier's general manager of network systems.

"The new system will sup-

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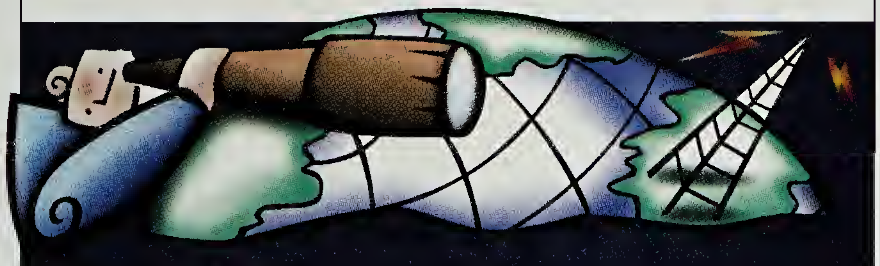


ELLEN PROCHNIK

SCOPING OUT ITS STRENGTHS

Admittedly, Telstra has several advantages over its U.S. counterparts in accomplishing its long-term goals. They include the following:

- **PRACTICE MAKES PERFECT.** Telstra has long been known for technical savvy in terms of bringing new services, such as Integrated Services Digital Network and Switched Multimegabit Data Service successfully to market, said Audrey Mandella, senior vice president of The Yankee Group's international division.
- **SMALL IS BEAUTIFUL.** Telstra's total user base of about 16 million is much smaller than that of the average BOC, as are its existing management systems, said Frank Dzubeck, president of Communications Network Architects. "U.S. carriers can't afford to replace entire systems," as Telstra is doing. "They have too much legacy stuff to get rid of."
- **THE RIGHT MAN AT THE RIGHT TIME.** CEO Frank Blount is a former AT&T vice president "associated with strategic direction and operations management" in the network services arm during AT&T's postdivestiture restructuring into a "nonmonopolistic entity," Dzubeck said.

Continued from page T3

port a seamless flow of information, from real-time network monitoring to fault correlation to network reconfiguration to trouble ticketing," Young said. "It will also monitor power, air-conditioning, security — with the goal [of] remotely managed, lights-out plant operations," he added.

Telstra is currently field trialing a plant management system based on TCSI Corp.'s Object Services Package 4.0. TCSI specializes in object-oriented network management software for the telecom industry.

One key attribute of the system is its support of the NMF's Telecom Management Network protocol. Any company aspiring to provide global networking services needs to support such global standards in order to hand off customer transmissions, records and fault and traffic information, analysts said (see story page T8).

Most important, integrated plant management is expected to help Telstra cut costs and boost productivity while improving service — a goal U.S. carriers are still struggling to accomplish. According to Young, the new system should increase up to tenfold the percentage of network fault information forwarded to customer support people, as well as reduce diagnosis time from three to five hours to only minutes per incident. ■

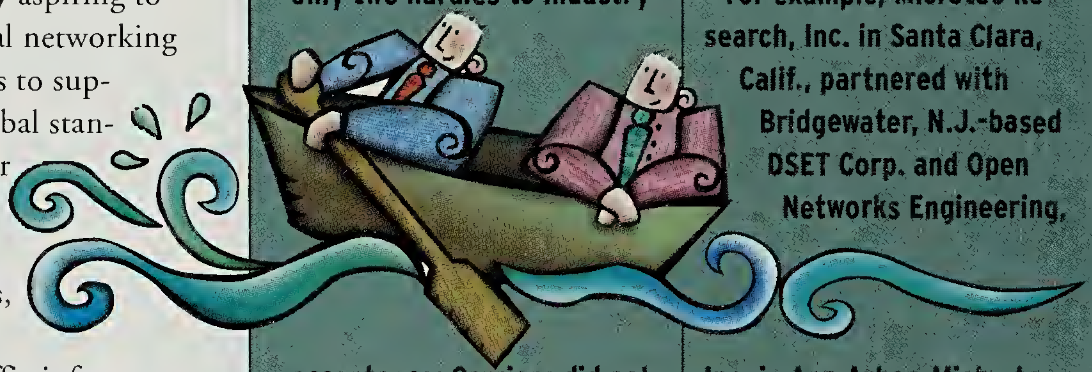
– ELISABETH HORWITT

TELECOM STANDARD HONED FOR NETWORK MANAGEMENT

Third parties are tackling the final hurdle to industry-wide acceptance of the TMN specification: cost

Don't look now, but the Telecommunications Management Network (TMN) standard may be on the verge of practical application.

When the TMN standard's framework was developed a few years ago, it really faced only two hurdles to industry acceptance: Carriers did not understand why it was so important, and network equipment manufacturers found it too complex – and thus too costly – to implement.



ELLEN PROCHNIK

Carriers' attitudes toward TMN have gotten a whole lot more positive in the past couple of years. A major motivator is growing customer demand for seamless global services that often involve multiple providers. Carriers increasingly view TMN as a crucial vehicle for both managing their own networking installations and exchanging data with partners (see story page T8).

The only problem is the cost, primarily in development time, of implementing the complex, multilayered TMN code, both on carriers' management platforms and on the network equipment that they manage.

Now third parties are attacking this remaining piece of the TMN puzzle.

First, embedded software tools are making it easier and far less expensive for networking equipment manufacturers to comply with the element layer and element management layer of the TMN framework.

For example, Microtec Research, Inc. in Santa Clara, Calif., partnered with Bridgewater, N.J.-based DSET Corp. and Open Networks Engineering, Inc. in Ann Arbor, Mich., to codevelop an embedded software solution that is said to streamline the use of compilers and debuggers to integrate TMN into network equipment.

Without such tools, implementing TMN's complex source code adds a time-consuming extra step to network vendors' product development cycle, said David Barnett, communications product line manager at Microtec. No wonder vendors balked, particularly given that carriers are starting to demand drastically shorter development cycles for their networking equipment.

In addition, carriers are getting assistance implementing TMN management and network service layer protocols. Among the key developments are the following:

Vendors such as IBM, Hewlett-Packard Co. and TCSI Corp. are providing TMN support for the network management platforms they target at the telecommunications service provider sector.

ISR Global Telecom's Orbit TMN tool kit, released several months ago, is said to enable carriers to implement TMN protocols on their management systems without being experts in TMN development. Standardized modeling and network functions simplify such tasks as network element database auditing, Q-3 interfacing, event correlation and others.

Woodland Hills, Calif.-based Vertel Corp.'s PowerCats platform is said to allow carriers to exchange management information ranging from customer records to network diagnostics.

With all the pieces for TMN conformance in place, carriers should start exploiting the standard as a way to deliver support and management across their own and other carriers' services in a seamless, integrated way.

At least they have little excuse not to. ■

– DAN O'SHEA

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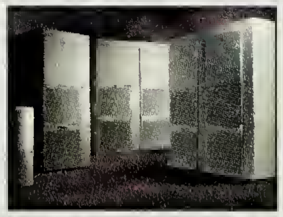

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Carriers Turn to the Web for End-User Support

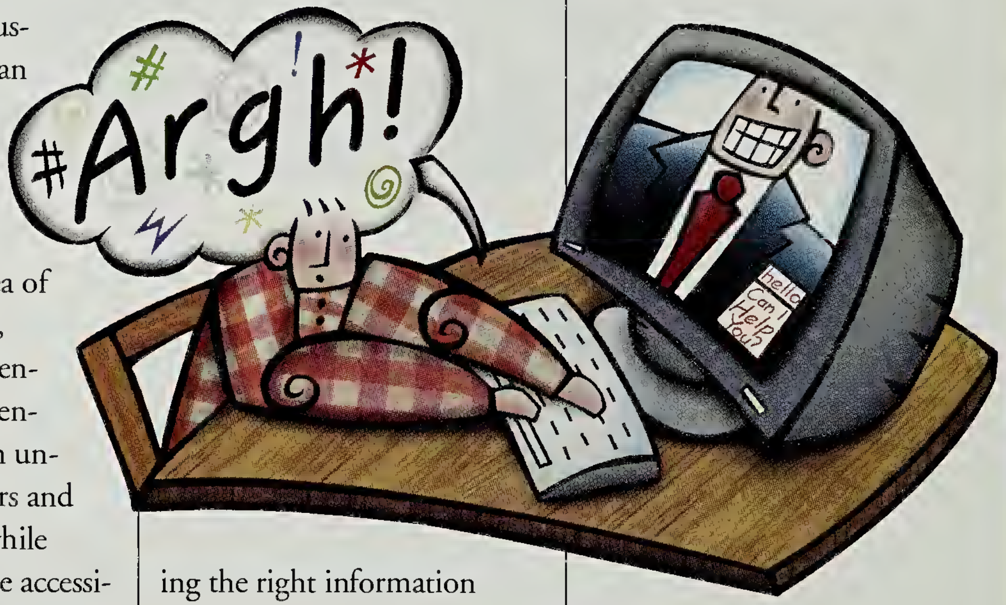
When Pacific Bell Mobile Services introduces its personal communications services (PCS) offering in the next few months, one of the perks it will offer customers is the ability to submit complaints, problems and questions over the World Wide Web.

For Pac Bell, the inducement for providing Web-based trouble ticketing is clear. It's a "cheaper alternative to tying up our 800 number" with customer calls, said Brad Peterson, director of information systems for mobile services. Indeed, the potential savings in help desk man-hours is substantial, considering "it takes at least four or five minutes per call, and we get about 100 a day," he said.

Pac Bell is far from alone. U.S. telecom service providers, along with high-tech vendors, have been among the first to implement the Web connections that vendors such as Remedy Corp., Vantive Corp. and Clarify, Inc. have provided for their help desk platforms in the past year.

Pac Bell, for example, is using the Web-based front end to Remedy's Action Request System (ARS) for both internal and external customer support. Web-based external support not only offers carriers the chance to "off-load work from [customer support] representatives" but also has the "potential of providing a new way of interacting with customers," said Hugh Bishop, director of emerging technologies research at Aberdeen Group, Inc., a Boston-based consultancy. "Say I'm a software provider and come up with a fix of a printing problem. I could send an outbound message saying, 'Hey, we've got this fix now,' to users who complained about the problem."

> *Pac Bell will* **SOON** *allow customers to send* **COMPLAINTS** *and* **QUESTIONS** *over the Web*


#Argh!
hello Can I Help You?

ELLEN PROCHNIK

On the other hand, offering support to external customers via the Web can be riskier and more problematic than Web-based internal help desk operations, particularly in the area of security. For example, how do you protect sensitive customer and vendor information from unprincipled competitors and malevolent hackers while keeping your Web site accessible to authorized users?

Help desk vendors have been addressing this problem by providing their own security features. Also in the works is support for Web programming environments such as Java, which will pave the way for more intelligent client/server interaction. Right now, for example, most platforms allow users to submit but not update a trouble ticket over the Web.

For internal help desk operations, on the other hand, the Web appears to provide clear benefits with few drawbacks. For users, submitting questions and trouble tickets via the Web is a handy way to avoid playing phone tag with busy help desk managers.

And for help desk managers, as Pac Bell can attest, every call submitted via the Web saves several minutes of eliciting the right information from an end user over the phone.

Another productivity plus: It takes staffers about 15 seconds per end user to install Remedy's ARWeb, compared with about 30 minutes for Remedy's original client software, Pac Bell's help desk said. That's because installing the ARWeb, unlike the ARS client, requires no desktop system reconfiguration.

US West Communications has discovered a raft of ways to boost productivity via Van-Web, the Web front end to Vantive's help desk platform. End users use the Web to enter trouble tickets, while help desk managers use it to "check the status on their own cases," said Tim White, an internal help desk manager at the carrier. And homegrown Perl scripts enable the Vantive server to collect real-time data on the health of distributed systems, which information technology staffers can then view as reports via browsers.

White's group has also set up Web pages with the answers to frequently asked questions, hoping to encourage users to answer their own questions whenever possible. "Right now, about 25% of end users check to see if the answer is on the Web before calling us," he reported.

Of course, not everyone is willing to forgo contacting a warm body at the help desk. US West, for example, has "about a dozen real chronic callers who never look at a Web page," White said.

Any downside? "Well," he said, "now that our ticket base is wide open for users to search through, we have to watch what we write on our trouble tickets." ■

– ELISABETH HORWITT

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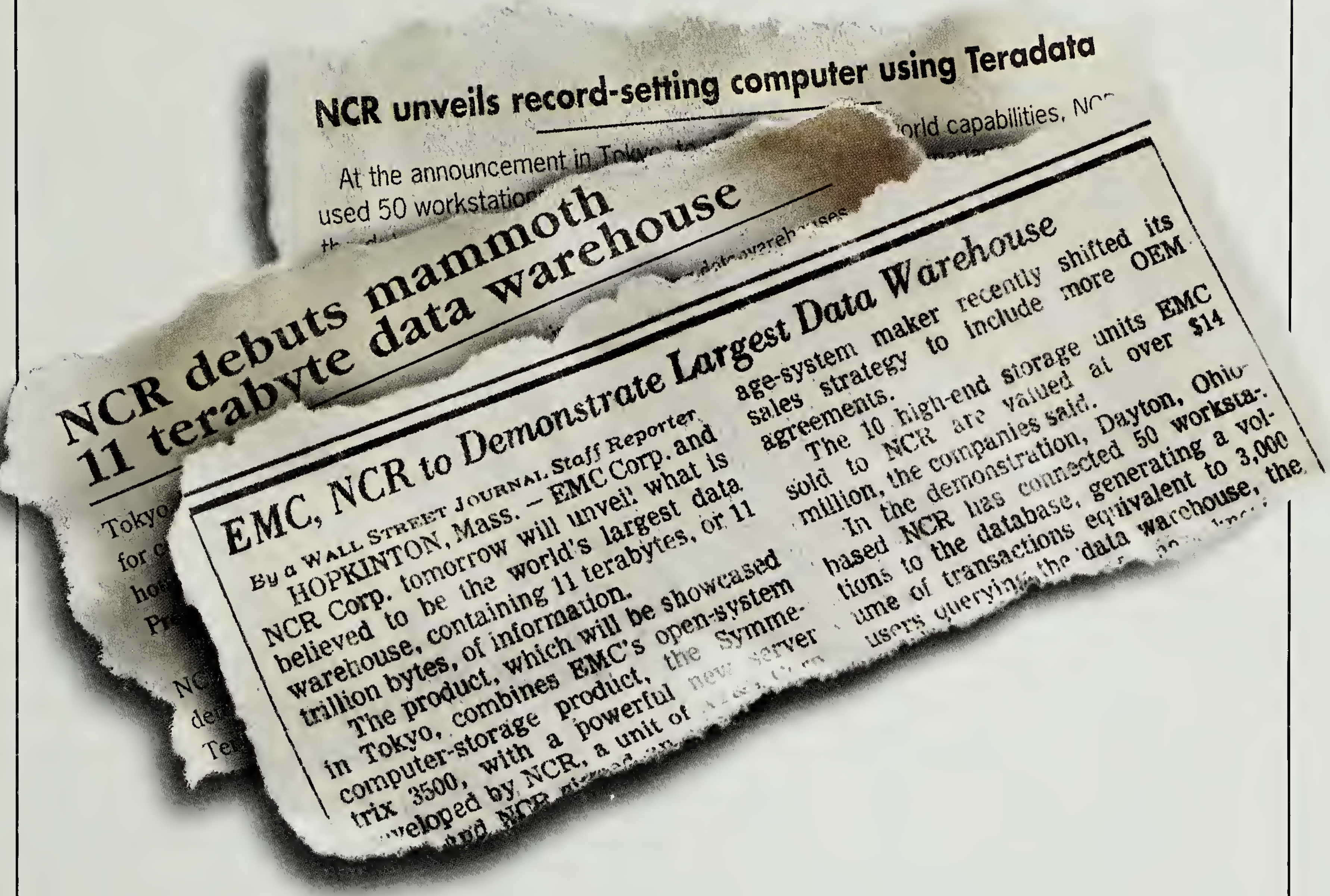

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EMC, NCR to Demonstrate Largest Data Warehouse

By a WALL STREET JOURNAL *Staff Reporter*

HOPKINTON, Mass. – EMC Corp. and NCR Corp. tomorrow will unveil what is believed to be the world's largest data warehouse, containing 11 terabytes, or 11 trillion bytes, of information.

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BREAKING DOWN THE walls

GLOBAL NETWORK PARTNERSHIPS ARE STRUGGLING TO LINK THEIR OFTEN PROPRIETARY SYSTEMS IN ORDER TO PROVIDE SEAMLESS BILLING AND SUPPORT

BY PAUL KORZENIOWSKI

An odd thing is coming to pass in the fiercely competitive global network service market. Carriers are sitting down and talking about how to get their systems to talk to one another. ■ At a recent Network Management Forum (NMF) conference, "people were saying how strange it was that service providers are now willing to sit down and work together in an open forum [on ways to exchange information] in competitive areas such as service operations and support," said Beth Adams, managing director of the NMF in Morristown, N.J. ■ What's driving carriers to such radical measures is, of course, the market. "The [global] telecommunications market is growing up and becoming more competitive," said Marta Mostovych, manager of network connectivity programs at General Electric Information Systems (GEIS). "So carriers are all listening closely to their biggest clients, and they all want more seamless, global networking services."

Corporate, multinational customers want "one touch" service that allows them to get their questions answered and all their problems solved through a single contact, Adams said. Frustrated by dealing with a variety of foreign carriers and managing global networks on an ad-hoc basis, businesses are demanding that carriers provide a single point of contact, single billing and integrated performance monitoring functions for global network services.

"Customers don't want pages of details" on their global network activities, Adams said. But they do want the global network service provider "to be familiar with their particular services and configurations and to be able to isolate, identify and correlate between what's happening in the network" and agreed-on service levels, she added.

The demands of multinational corporate customers are leading global network service providers to execute what amounts to a 180-degree turn from their traditionally closed, proprietary systems strategies.

However, willingness to link up with rivals is only the first step. The real killer is how to make carriers' disparate systems more compatible. Telecom service providers now face major overhauls of their computing infrastructures to make them more flexible, standardized and open.

"We are trying to build the ultimate distributed computer system," said Trevor Boyd, manager of systems development at BT's global engineering division in London. The job is especially difficult because the current systems supporting carriers' network operations and management comprise massive amounts of homegrown, mainframe-based code.

"The coding used in carrier systems is old, and transforming it to meet current requirements is a Herculean task — if it is at all possible," noted Bob Crowley, vice president of business development at Kenan Systems Corp., a telecommunications software supplier in Cambridge, Mass.

Even more discouraging, from an information exchange point of view, is the proprietary nature of this homegrown code. Each carrier developed a different way to define, present and handle key functions such as accounting, customer records and network monitoring, as well as the underlying database structures, communications protocols and document formats.

The obvious, most straightforward solution is for the industry to agree on and then migrate to a single set of standards for defining, collecting, presenting and exchanging information across carrier systems. Then everyone would, at least in theory, be able to link systems with everybody else. The NMF is one of the main organizations working with carriers toward interoperable standards (see story page T12). However, all the pieces of the puzzle probably won't come together for years.

In the meantime, carriers are making do with existing standards such as Simple Network Management Protocol (SNMP), X.400 and electronic data interchange (EDI). They are also coming together in limited partnerships and consortia, which can then agree on a set of gateways, middleware and common protocols to link systems with one another, if not with the

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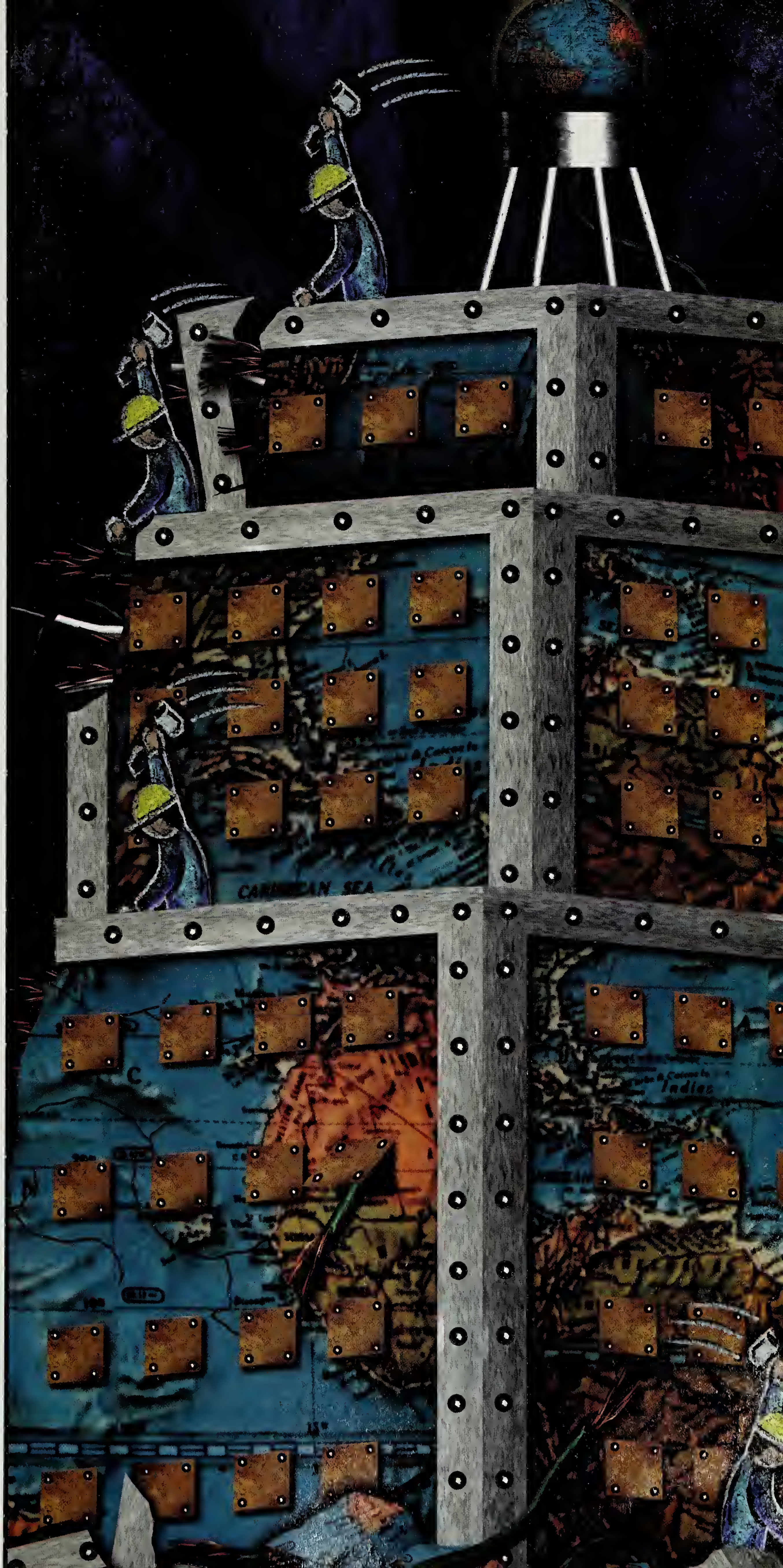
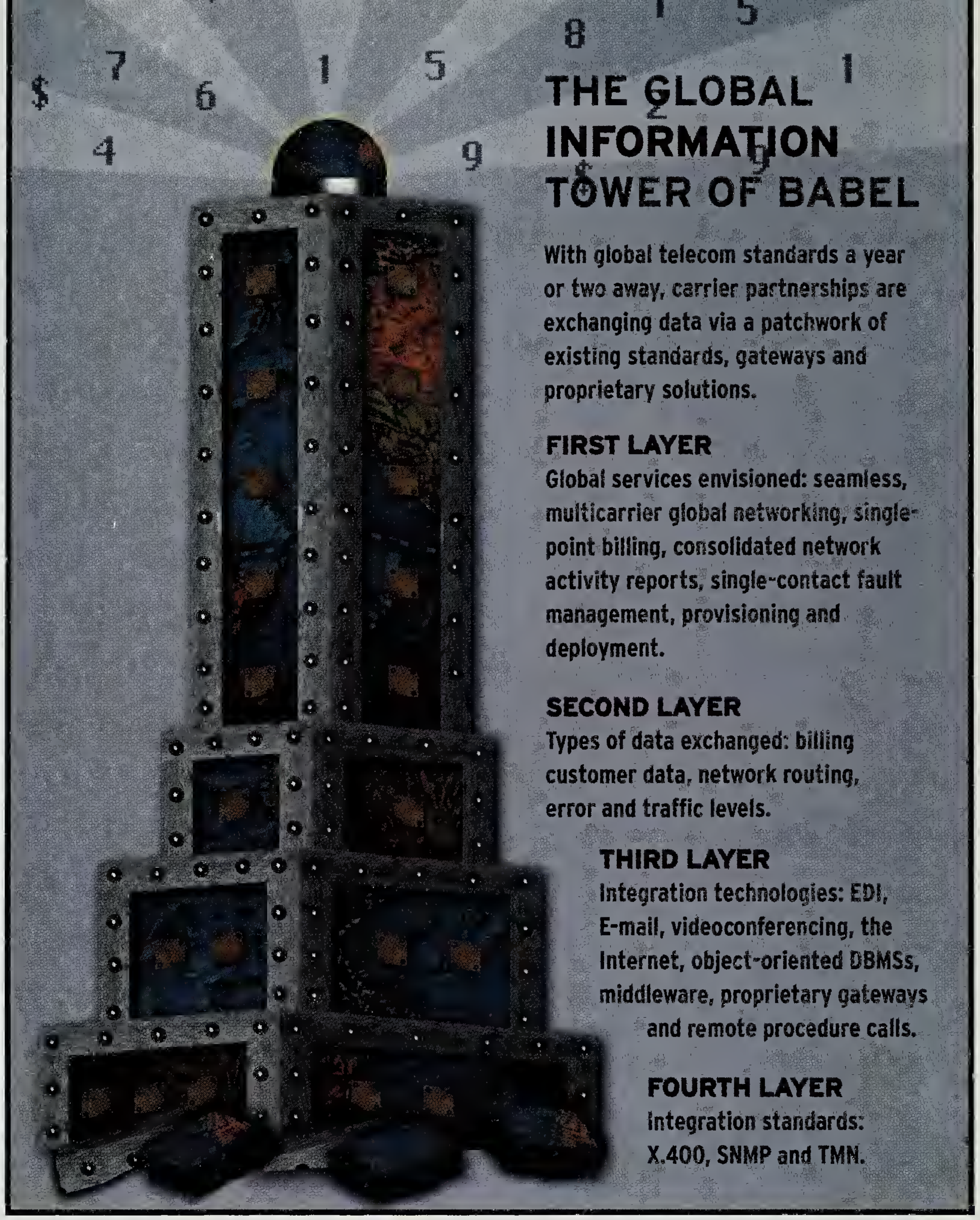


LARRY GOODE



THE GLOBAL INFORMATION TOWER OF BABEL

With global telecom standards a year or two away, carrier partnerships are exchanging data via a patchwork of existing standards, gateways and proprietary solutions.

FIRST LAYER
Global services envisioned: seamless, multicarrier global networking, single-point billing, consolidated network activity reports, single-contact fault management, provisioning and deployment.

SECOND LAYER
Types of data exchanged: billing customer data, network routing, error and traffic levels.

THIRD LAYER
Integration technologies: EDI, E-mail, videoconferencing, the Internet, object-oriented DBMSs, middleware, proprietary gateways and remote procedure calls.

FOURTH LAYER
Integration standards: X.400, SNMP and TMN.

Continued from page T9

rest of the world.

During the past few years, three such consortia have come together. BT teamed with MCI Communications Corp. to form Concert. WorldPartners, formed in 1993 by AT&T, Kokusai Denshin Denwa Co. in Japan and Singapore Telecom, has since expanded to 16 carriers. And the Global One alliance comprises Deutsche Telekom, France Telecom and Sprint Corp.

Even within the more limited environment of a consortium, in-depth information systems integration is a long, painful process that could take five to 10 years, according to Ellen Clifford, a senior consultant for local and long-distance services at TeleChoice, Inc., a Verona, N.J., consulting firm. The Global One team, for example, has not yet decided even what type of architecture it will put in place to link its members' systems.

Still, limited collaboration poses less complex problems than universal integration and allows members to avoid duplicating efforts.

For example, WorldPartners' goal is to enable members to offer customers a single point of contact for ordering, installing and maintaining communications services in 31 countries, noted Bill Mirth, director of billing engineering at WorldPartners' Washington office.

Rather than develop the necessary cross-systems gateways on a case by case basis, the consortium is adopting common specifications for functions ranging from provisioning a new service to generating a customer invoice. The organization's membership agreement includes strict compliance criteria that each carrier must meet. WorldPartners holds quarterly meetings to update members' conformance to the standards and outline any needed additions.

WorldPartners created a separate subsidiary to coordinate the effort. "We wanted the standards to be global and nonbiased in nature," Mirth said.

The subsidiary, which now has 100 employees, also acts as a clearinghouse, building and supporting the gateways that move information from one partner's computer system or network to a second. Operations centers in three U.S. cities, as well as in Singapore and Tokyo, support consolidated billing for the various network services the consortium offers. The organization selected EDI and the International Standards Organization's X.400 electronic-mail standards as the foundation for exchanging billing information. The member organizations already relied on these specifications to move information internally and to their customers.

WorldPartners maintains Unix-based servers that route and transport transactions between the systems. Currently, the system can pass a Kokusai Denshin Denwa-generated bill to AT&T's billing system for distribution to a U.S. customer.

Of course, "putting the connections in place was our first challenge," Mirth said. "Now we have to enhance them so they can mask country differences." For example, right now a customer bill still has Kokusai Denshin Denwa charges in yen and the U.S. part in dollars, pleasing neither an American nor an Asian customer.

CRITICAL TO SUCCESS

Another crucial service area that requires cross-carrier integration is network management.

WorldPartners currently offers Customer Network Management Service (CNMS), which enables a frame-relay customer to call up network performance management and capacity planning data on a desktop equipped with SNMP software. CNMS provides hourly statistical data and proactive alarm notification on the customer network through direct access to WorldPartners' network control center in South Plainfield, N.J. The BT/MCI Concert partnership offers a similar SNMP-based service.

These "new network management ser-

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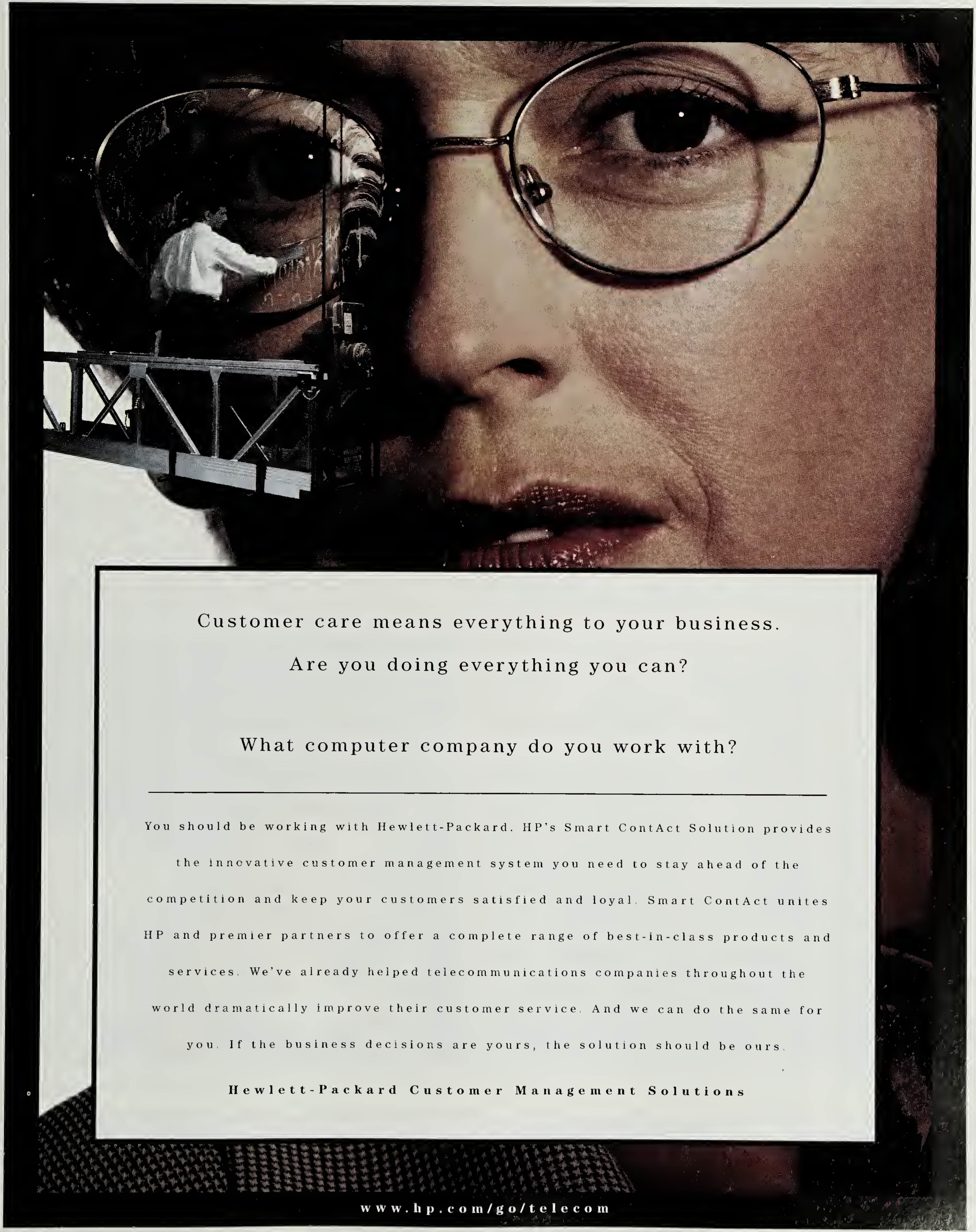

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TMN A HAPPENIN' STANDARD

Two years ago, NMF director Beth Adams hopped around the world, trying to get various carriers to admit they needed to work together on a common set of network management and customer support information standards. It wasn't easy. ■ When carrier representatives finally convened, the need to collaborate gave way to a general fear of giving away the store to rivals sitting across the table. "We had to step back and come up with a common business model" that would allow carriers to define processes they had in common, such as billing and problem management, without giving away proprietary information, Adams said.

Indeed, the telecommunications service providers have historically shied away from global standards, feeling that their network infrastructure was their competitive advantage. Further, they have tended to design their systems to meet their own needs, not to link up with competitors.

The exception was internal network management. Carriers adopted first Common Management Information Protocol and then SNMP to manage their own multivendor networking installations in an integrated fashion.

In the past two years, pressured by customers demanding cross-carrier integrated network support, carriers have finally become willing to work with the NMF on the bigger standards picture, according to Adams.

That work is embodied in the NMF's Telecommunications Management Network (TMN) — a "four-layer pyramid with business management at the top, then service, then network management, then element management," she said.

Indeed, NMF efforts have recently "moved up the value chain of the TMN model, from transport up to the application and even the business service definition layer, Adams said.

An NMF effort called Smart "defines business-level requirements for where carriers need to have their systems interact automatically with those of other carriers and with customers," Adams said. For example, carriers need to exchange trouble tickets in order to manage customer networks that traverse their domains.

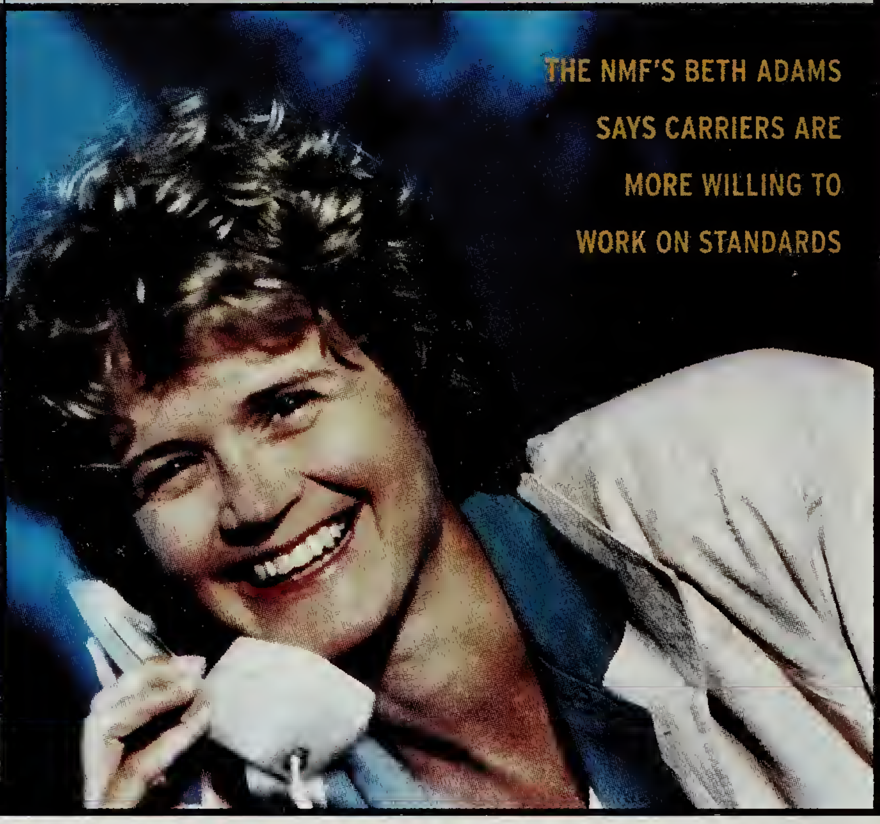
The NMF has also made progress toward promoting the adoption of international rather than national standards. For example, it is prodding carriers worldwide to adopt X.790, a new International Telecommunications Union trouble ticketing standard. The NMF's previous trouble ticketing effort, Omnipoint 1, was adopted only by U.S. carriers.

The NMF is now focusing on billing and performance monitoring standards, which it hopes to complete next year, Adams said.

The question is how quickly carriers will implement the NMF specifications. Adams said she expects it to happen gradually over the next few years.

For some carriers, it will happen sooner than later. The BT/MCI partnership, for example, uses BT's proprietary management platform, Concert, and proprietary interfaces to collect data from four network control centers around the world. However, the partnership would prefer open interfaces, said Trevor Boyd, manager of systems development at BT's global engineering division. It has begun testing X.790 with an eye to adopting it early next year.

And other carriers had better quickly follow suit if they want to compete in the global network services market, said Frank Dzubeck, president of Communications Network Architects, Inc., a consultancy in Washington. "If a network management system doesn't support TMN, then it's interim."



THE NMF'S BETH ADAMS SAYS CARRIERS ARE MORE WILLING TO WORK ON STANDARDS

SHONNA VALESKA

Continued from page T10

vices are an improvement over past systems, where a customer had to wait for a carrier or for an irate user to call to know there was a line problem," Adams said. However, "if customers are working with multiple carriers, then they still have to deal with multiple management systems."

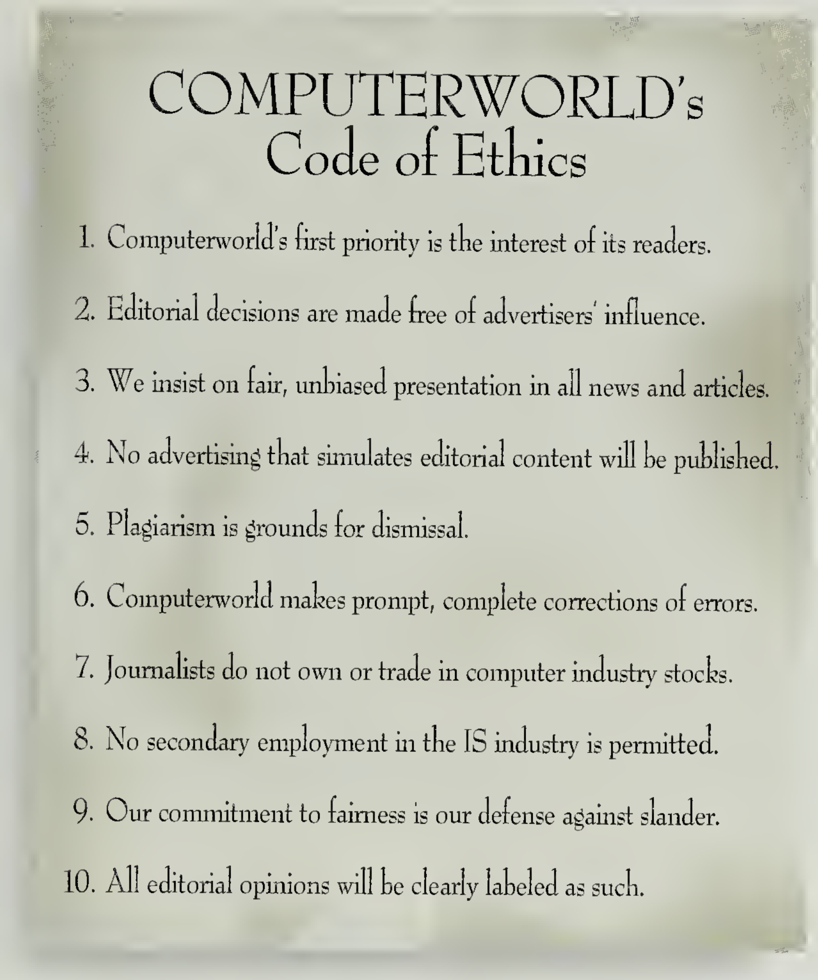
Carrier partnerships need a way to provide customers with integrated network activity and problem reports that span different carriers' pieces of a global circuit, she added.

To attain that goal, carriers must develop ways to move information via three transport mechanisms: Common Management Information Protocol/Services, SNMP and remote procedure calls. The NMF has started to examine that issue (see story above).

Current customer services that the partnerships offer are new and pretty rudimentary. The BT/MCI alliance has no integrated customer network management system yet. WorldPartners rolled out its system only in May.

While WorldPartners membership is open to all carriers, MCI and BT set up a far more limited partnership. This, in

Please turn to page T14



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Continued from page T12

turn, enables them to collaborate much more closely and selectively on cross-systems integration challenges.

The two formed Concert, an independent subsidiary. BT owns 75% of the organization, and MCI holds the remaining 25%. Concert, which now has 900 employees, has been staffed primarily with former BT and MCI employees and a smattering of outsiders. Concert is responsible for developing the software needed to connect BT's and MCI's existing computer infrastructure into a seamless network service. Concert is also the brand name for the partnership's global services portfolio, which includes virtual private networks, audioconferencing, electronic messaging, frame relay and remote LAN connectivity.

The two companies found their internal infrastructures complementary. "BT had a strong research laboratory, which was something we lacked," said John Gavan, director of network information systems at MCI's Systems Engineering Department in Colorado Springs. "We had developed a client/server architecture, which was something BT had only begun to move to."

MCI brought to the table a Unix-based client/server platform to support Concert's rapidly expanding service portfolio. MCI and BT also met recently to discuss how BT might link up to — or even adopt — MCI's new client/server convergence billing system, Horizon.

In addition, MCI delivered Concert's order-entry system. An MCI-built client/server fraud control system may also be added to Concert's repertoire.

The flexibility of the client/server infrastructure has significantly cut the time to market of new Concert services. For example, it enabled Concert to roll out a recently announced Internet service in less than a year, BT's Boyd stated. "Without the infrastructure, deployment would have taken two to three times as long."

Obstacles to information integration persist, including low-level incompatibilities between the carriers' respective switches.

BT, for instance, relies on central office switches from Ericsson Electronics AB, while MCI uses Northern Telecom Ltd. equipment. The switch vendors' mind-set has been like computer manufacturers in the 1980s: Rather than cooperate on standards so customers can mix their systems with others, they delivered products with closed, proprietary interfaces.

Currently, no standards exist to enable incompatible switches to exchange call setup information. BT and MCI have induced their respective suppliers to build a connection to enable their respective switches to pass signaling information back and forth whenever a call is initiated. BT houses its signaling information in a series of relational database management systems — primarily Oracle Corp.'s Oracle — that have been honed to operate like one system. If the two companies could link MCI's signaling DBMS to BT's DBMS, Concert could offer users a global dialing plan so employees could dial up colleagues in any part of the world without entering confusing country codes.

Overcoming data differences stretches the limits of RDBMS technology. BT's Boyd said he expects object-oriented DBMSs will eventually ease that burden. BT has been dabbling with such products, and Boyd said the carrier should build applications that rely on object-oriented DBMSs in a few years.

Of course, not all interaction between global partners takes place between computer systems. Consortia are also looking for technology to support and facilitate ongoing communication among the human planners, managers and technicians. One common problem is time zone differences. "We are seven time zones apart from BT, so it can be difficult to keep our plans in sync," MCI's Gavan noted. The two companies rely on videoconferencing, E-mail and the Internet to facilitate human interaction across time zones.

Integrated customer support is a more complicated matter for the full global service partnerships careening across the globe. WorldPartners, for example, has expanded its service from four to 31 countries in the past three years, and analysts expect the pace to quicken during the next few years.

And as the global service providers expand their reach and service portfolio, the urgency to integrate their information and networking systems will increase, TeleChoice's Clifford said. Indeed, she added, "Seamless service to its customers" is becoming a sine qua non for any carrier "that wants to be considered a top tier telecommunications provider." ■

VANS HAVE IT EASY

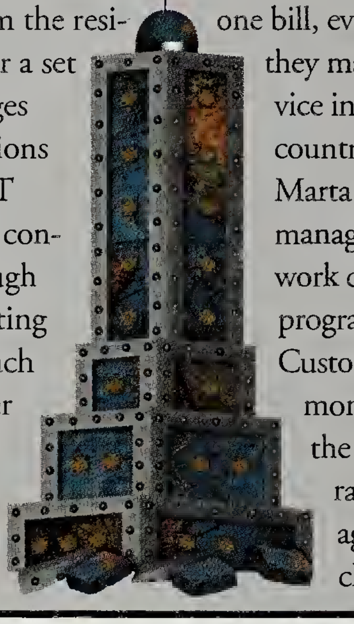
Value-added network (VAN) vendors have felt less of a need to integrate their systems with those of major overseas carriers. As data-only service suppliers, they stayed free of government regulations that prohibited anyone but the local Postal Telephone and Telegraph authorities from offering basic telephony services.

As a result, VANs have been able to set up their own network nodes in many countries.

This has simplified integrating customer support for the VANs. GEIS, for example, sets up its own network nodes to handle traffic in and out of each country. It leases local lines from the resident carrier for a set fee and manages those connections the way AT&T manages local connections through the Bell operating companies. Each national carrier sends GEIS a bill at the end of each month.

GEIS's equipment collects activity and management data pertaining to customer activity, then funnels it back to GEIS's central control center in Rockville, Md.

GEIS has designed applications to collect billing information so international companies receive one bill, even though they may have service in multiple countries, said Marta Mostovych, manager of network connectivity programs at GEIS. Customers pay flat monthly fees for the services rather than usage or packet charges.



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A CLASH OF

Carriers and users work out differences while building a national ATM network prototype

BY DENISE PAPPALARDO

At the Supercomputing '95 conference last December, Tim Kuhfuss, director of the electronics and computing technologies division at Argonne National Laboratories, startled his audience by speaking on behalf of the other side: the network equipment vendors and carriers that users typically view with wariness if not outright hostility.

The burden of Kuhfuss' message was that scientists can't expect carriers and vendors to donate Asynchronous Transfer Mode (ATM) switches and services simply because a lab is conducting a state-of-the-art experiment that needs high-capacity connections. Rather, end users need to persuade vendors that a project will serve their business interests.

Kuhfuss was passing on to his audience some of the wisdom he's gained from his recent work on the Information Wide Area Year (I-Way) network. The year-long project resulted in the first successful integration of public and private ATM networks into a single, virtual, nationwide system. Perhaps more importantly, it came about through an unprecedented three-sided collaboration among U.S. carriers, research and scientific users, and application developers.

During a demonstration at Supercomputing '95, the prototype network successfully ran CPU- and bandwidth-intensive scientific and engineering applications across groups of geographically distributed computers. While not all applications worked over the network, a number of developers got a sense of ATM's potential to support a higher level of speed and interaction.

The I-Way was a learning experience for its participants on at least two key levels. On the technical side, carrier and private-sector network engineers gained knowledge on interconnecting their respective ATM facilities. They also learned how to route Internet Protocol traffic over multivendor ATM equipment — a particularly tough job at the time because several key ATM standards were still on the drawing board.

One measure of the project's success: At various times during the conference demonstration, different carriers' network operating centers were exchanging networking information so they could hand off ATM traffic to one another. This was unheard of prior to the I-Way event, Kuhfuss said.

All parties involved see I-Way as the first step toward learning what is needed for the next-generation information highway, Kuhfuss said. Argonne and others are in the early stages of planning an integrated ATM network that would anticipate what the future Internet will look like.

But at least as valuable were the insights users and vendors got into one another's thought processes in their time together in the ATM trenches.

Argonne headed up the network planning and architecture for the I-Way project and in mid-1994 started gathering together application developers, carriers and vendors to map out a network strategy. "We had to figure out how to develop a seamless ATM network comprised of multiple smaller ATM networks from around

PROJECT COUNTDOWN
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DEVELOPERS BALK AT COMMITMENT
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the country," Kuhfuss said. "We knew it would be a big deal."

One of the first tasks, begun in late 1994, was to persuade carriers and application developers to take part in what was, initially, a grass roots effort of the network engineering community. Carriers in particular needed strong commercial incentive to donate their ATM bandwidth and technicians to a long-term project. Another major difficulty was persuading them to sit down with their archrivals and frankly discuss the technical ins and outs of their networks.

Most of the network engineers at Argonne and other research laboratories had no sense of how necessary it was to pique carriers' commercial interest — they saw the project as worthwhile in itself. So Kuhfuss brought in Mary Spada, a principal analyst at Global Growth Strategies, Inc., a Silver Spring, Md.-based strategic planning group, as a liaison between the two groups.

Spada had a history of working with the carriers and was technically savvy as well. In addition, Kuhfuss said, she had a Rolodex of carrier contacts "that most people would kill for." She turned out to be indispensable in finding the appropriate way to position the I-Way project for the carrier market.

With Spada's input, Kuhfuss presented I-Way to the carriers as a project designed to look at what happens when truly interactive applications run on an ATM infrastructure. "We are not talking about video or data over ATM but integrated environments," Spada said. "If ATM is supposed to be the beacon of light at the end of the tunnel, then it's really important for the research end to know and try to facilitate this over that environment."

Even though carriers were talking about making huge investments in core switching architectures, they had no real research and development to confirm that ATM is the best choice for carriers building a national network, Spada said. I-Way was designed to take ATM out of the world of the hypothetical addressing issues that were specific to content and traffic patterns. Issues such as middleware, network management and IP over ATM were new ground 18 months ago. Carriers were able to use this real world experience to go back and tweak their ATM networking plans and goals.

Kuhfuss was able to persuade carriers that I-Way was a chance to test and enhance their ATM networks' ability to bear a full application load. "Carriers were in a rut in terms of their research and development. There weren't very many commercial users that were fully interactive or using bandwidth-intensive applications," Spada said.

I-Way was sold to applications developers as an environment that would let them expand their horizons by working in a distributed heterogeneous scientific environment, said Linda Winkler, manager of advanced networking at Argonne and an I-Way network architect. The success of Argonne's enthusiasm-generating efforts became clear at an April meeting, when application developers, network planners, carriers and vendors gathered at Argonne to further discuss the project. Kuhfuss said he had expected 40 to 80 people; 250 showed.

Then, on the third day of the meeting, the carriers' competitive mind-set raised its ugly head. Argonne had set up a map indicating which application sites still needed ATM connections. The map also showed the primary long-distance carrier for each university or laboratory. "The room was very quiet. I expected to have everyone jumping up and volunteering [to deliver the missing ATM links], but that didn't happen," Kuhfuss said.

Instead, carriers seemed to be saving their energy for a concerted rush to the phones after the presentation was over, Kuhfuss said. A carrier representative clued him in on what was going on: a race to get hold of customer sales reps. Argonne's little map had

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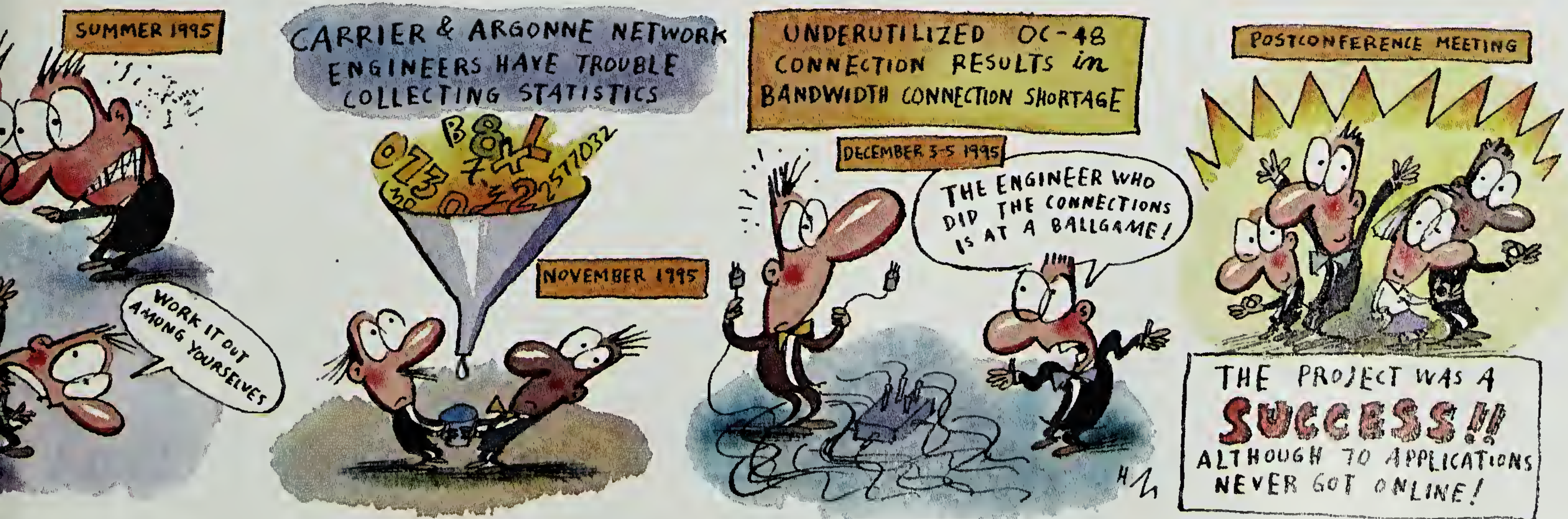
CULTURES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THE PROJECT WAS A SUCCESS!! ALTHOUGH 70 APPLICATIONS NEVER GOT ONLINE!

HAL MAYFORTH

Continued from page T17

unintentionally provided months of competitive analysis on prospective clients.

As the project progressed, the carriers' control issues raised difficulties. Originally, Argonne's network engineers had planned on handling all the network-to-network interconnection among carriers. The carriers balked at this, Argonne's Winkler said, because they wanted to maintain control of their own end-to-end facilities. After a long struggle with the carriers, Winkler and other network architects threw up their hands in frustration the week before Supercomputing '95. They made the carriers figure out interconnection issues.

Communications gaps kept cropping up during the project. In particular, I-Way network managers couldn't gather key network capacity planning data before the demo (see story below), so they were configuring the network up to the eleventh hour, Kuhfuss said. And during the demonstration, network connections often came up right before the application was to start.

About 70 applications did not get on the network at all, for a variety of reasons, including network management and network configuration availability problems and server-side resource shortcomings.

One reason for bandwidth scarcity, at least initially, was a problem in the configuration of the OC-48 connection coming into the convention center in San Diego.

"The guy who was responsible for [putting up the connection] was great, but he didn't understand what we were trying to do," Kuhfuss said. After connecting only two of the 48 T1 links in the OC-48 line, he went to a baseball game. Two T1 links is more bandwidth then any trade show has ever used, so the engineer couldn't imagine why this event would need more than that.

"We realized he wasn't around when some of the equipment was not coming up as fast as was needed on the show floor," Kuhfuss said. Once the problem was identified, however, the user/carrier ties established during the project went into high gear. "They put a call in to the carrier, and five people showed up to adjust the problem, and it was fixed," Kuhfuss said.

Carrier and network engineers learned a lot during the demonstration about the demands of the Cave Automatic Virtual Environment (Cave), a supercomputer-based, integrated multimedia service that incorporates virtual reality.

The amount of data that has to be collected and put in the Cave to construct this environment is substantial, Spada said. Further, the service is intolerant of latency and therefore of even minor network throughput problems. Probably the biggest lessons the carriers learned, however, had to do with end users' concern or lack of concern about what was going on the ATM network. End users are focused on the behavior of Caves and other applications, not on the gory technical details of what is happening at the core of the network.

Lawrence Livermore National Laboratory's center for applied scientific computing, for example, created a Cave over I-Way that let scientists visualize results from their computation physics research about magnetic fusion, according to Gary Kerbel, a computation physicist at the center.

Although Kerbel's Cave demo worked, he still didn't get the bandwidth he expected. Kerbel's ATM connection was expected to support up to 30M bit/sec., but he ended up with less then 1M bit/sec. "I count myself to be extremely lucky to have been able to use the system at the conference," Kerbel said. "Eighty percent of the people using the network were disappointed."

Other application scientists at the conference complained about the network being down quite a bit, Kerbel said.

But he was quick to point out that the I-Way project was not supposed to be business as usual: "This was leading, bleeding-edge use of this technology."

The bottom line, Kerbel said, is that people learned a lot about what could possibly go wrong in an environment like this.

At a post-I-Way meeting, it was clear the applications people and networking people had different ideas about the demo's level of success. Some of the application developers complained that they couldn't get their ATM connection when they needed it or the full bandwidth they'd expected.

Yet when the attendees were asked whether their science had advanced based on the work they were able to do during Supercomputing '95, all raised their hands. ■

PAPPALARDO IS EAST COAST BUREAU CHIEF AT TELEPHONY MAGAZINE.

GLITCHES **GALORE**

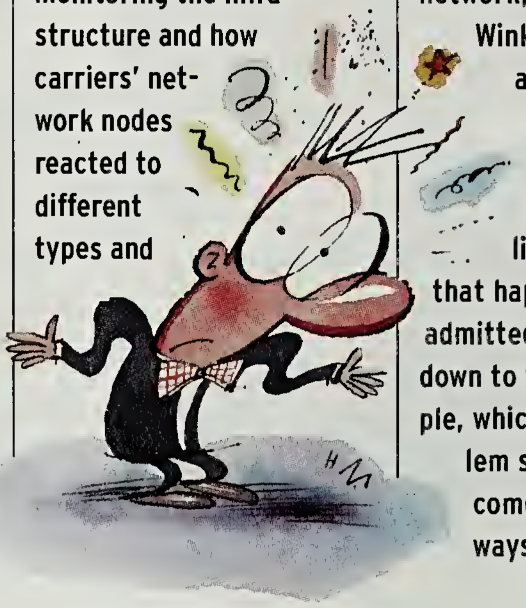
About a month before Supercomputing '95, the I-Way project team got the feeling the carriers were not comfortable with how things were unfolding.

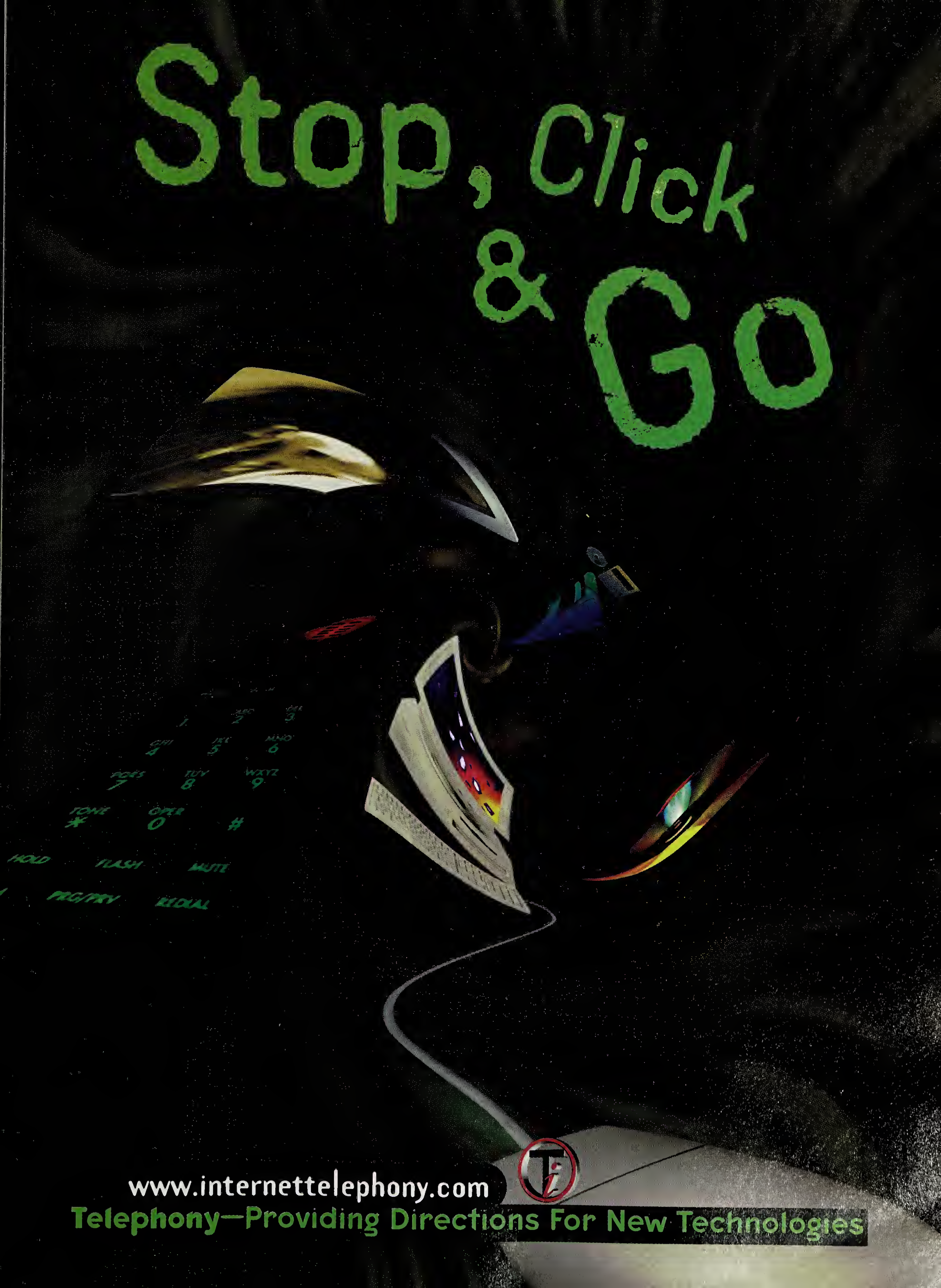
The trouble centered on network capacity planning. Argonne had designed a software tool called I-Soft to let I-Way application developers track the availability of network resources for their applications across a distributed environment.

Network engineers from the research side, however, complained that I-Soft did not provide the data they needed to predict how much of which network resources a given application would use during the demo. For example, service providers had no idea when peaks would occur in certain applications, and there was often minimal data about bandwidth usage and latency tolerance, Argonne IT director Tim Kuhfuss said.

Kuhfuss' group also ran into problems setting up a central network manager to be solely responsible for monitoring the infrastructure and how carriers' network nodes reacted to different types and levels of traffic. Unfortunately, the carriers had not supplied the necessary information on their network nodes because they felt some of it was proprietary.

In the end, many network links had to be configured at the last minute, just as applications were coming up on the demonstration network, recalled Linda Winkler, manager of advanced networking at Argonne. "It did work out, but we would have liked to have seen that happen sooner," she admitted. "When you get down to the technical people, which is what [problem solving] always comes down to, it always worked out." ■





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IT Managers: It's the End of the World As You Know It

If your competitors are aggressively deploying a hot new technology, you'd better be doing the same — or be able to explain to upper management why it's not a good idea.

BY MICHAEL DORTCH

So, the world as you know it is ending. Now what do you, the telecom service provider IT manager, do?

Stop spending so much of your time behind a screen tweaking your network. Come out from behind that console and start networking with your customers — those folks in marketing, accounting and customer support who depend on your "back-room" systems to do their jobs.

Most important, you need to set up a two-way dialogue with upper management. They can give you the lowdown on the company's long-term strategy and the market and business factors that play into it. You need to explain to them why IT is crucial to furthering that strategy. Only then can you become a valuable corporate team player.

And make no mistake about it: Your company needs your active participation as it struggles to position itself. Shakeout and consolidation will hit carriers hard during the next few years. Competition between local and long-distance carriers will intensify, along with customer demand for new services and better support.

Your practical advice on technical support and implementation issues could help your company avoid hidden rocks and shoals in these treacherous waters. For example, sound advice from IT might have saved a rival (or, dare I say it, your company) the embarrassment of promising ISDN or wireless data services it was unable to deliver cost-effectively and profitably.

What can you do to increase IT's — and, incidentally, your — value to your company?

■ **KEEP A CLOSE EYE** on what your company's competitors are doing to make sure you're not falling behind or going off in the wrong direction. If your company strategy depends on widespread implementation of ATM but the industry appears to be moving to Fast Ethernet or some other alternative, you might want to have a talk with your counterparts in strategic planning. If your competitors are aggressively deploying a hot new technology, such as object-oriented network management (and they are), you'd better be doing the same — or be able to explain to upper management why it's not a good idea.

■ **USE YOUR EXTENSIVE** real-life experience to help corporate management get a handle on the costs of upgrading platforms and adding new technologies to the current mix. This will provide a useful reality check against management's projected earnings, especially during consideration of new service offerings.

■ **KEEP THE LINES OPEN** to your customers, particularly in business-critical departments such as marketing, accounting and customer support. This will help you to better identify and address their specific information and technology needs. And you can learn through them how to better service the needs of your company's customers. For example, several carriers' IT departments are working closely with customer support to explore Web technology as a vehicle for internal and external customers to submit trouble tickets and look up network status reports (see story page T6).

Instead of waiting for corporate management to outsource all IT operations, identify the functions it makes sense to move outside in order to focus internal resources more effectively. It's working for many of your customers, so it might work for your company, too.

Steps like these will help your company stay competitive in a roiling, sometimes nasty marketplace. In addition, they can help ensure you'll still be gainfully employed two, three and five years from now. ■

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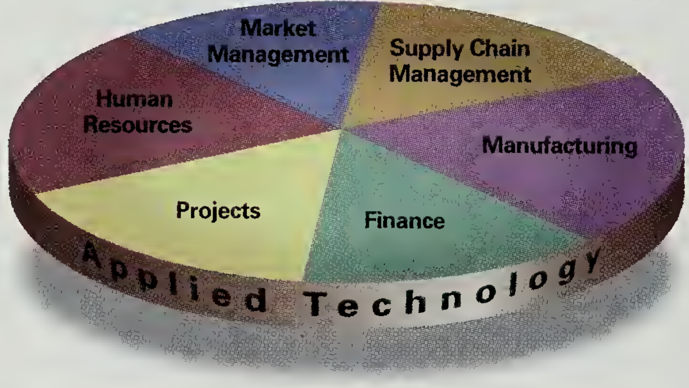

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